The Intercontinental Journal of
Internal Medicine

DOI: 10.51271/ICJIM-0032

Case Report

Obesity and diabetes, the pandemic of our time: the difficult to manage complication of diabetes, diabetic foot

Artuner Varlıbaş[1], Şeyma Kılıç[2], Muhammet Numan İbiloğlu[2], Aydın Çifci[1]

[1]Department of Internal Medicine, Faculty of Medicine, Kırıkkale University, Kırıkkale, Turkiye
[2]Medical Student (Phase IV), Faculty of Medicine, Kırıkkale University, Kırıkkale, Turkiye

Cite this article: Varlıbaş A, Kılıç Ş, İbiloğlu MN, Çifci A. Obesity and diabetes, the pandemic of our time: the difficult to manage complication of diabetes, diabetic foot. *Intercont J Int Med.* 2024;2(2):36-38.

Corresponding Author: Artuner Varlıbaş, artunervarlibas@gmail.com

Received: 17/04/2024 ◆ **Accepted**: 21/05/2024 ◆ **Published**: 29/05/2024

ABSTRACT

Overweight and obesity are major problems worldwide, affecting more than half of the adult population. With wrong eating habits, the rise of fast-food culture and sedentary lifestyles, obesity continues to spread almost all over the world. In addition to the many physical problems obesity causes, it also significantly affects mental health. One of the most feared conditions caused by obesity is type 2 diabetes, a systemic disease that negatively affects every part of the body. In addition to the many problems it causes, diabetes causes foot problems in one out of every 6-7 patients throughout their lives, some of which may lead to limb loss and even death. The average life expectancy of patients with diabetic foot is significantly shortened. Treatment of these patients is also very costly. In this case report, we tried to explain the relationship between obesity and diabetes and diabetic foot problems that can lead to serious financial and moral losses.

Keywords: Obesity, diabetes, diabetic foot

INTRODUCTION

Obesity is an abnormal and excessive increase in adipose tissues in the body to the extent that it impairs health. Obesity is considered obesity when the amount of fat exceeds 25% of total body weight in men and 30% in women.[1] Although the prevalence is increasing in both sexes and in all age groups, it is more common in older women and men.[2] Obesity is associated with heart disease, hypertension, hyperlipidemia and various cancers.[3] A common disease associated with obesity is diabetes.[4] Approximately 90% of individuals with type 2 diabetes are overweight or obese, accounting for 90% to 95% of diabetes cases in the world today.[5] There is overwhelming evidence that an increase in body-mass index (BMI), visceral adiposity and body weight predicts the future development of type 2 diabetes mellitus (DM).[6] DM is a chronic metabolic disease characterized by high plasma glucose levels that over time cause serious complications in the heart, vascular structures, eyes, kidneys and nerves.[7]

Neuropathy and loss of sensation in the hands and feet are also common symptoms of diabetes. Patients with loss of sensation may not realize when they are injured. Diabetic foot is a long-term complication of diabetes, with approximately 15-25% of all diabetic patients experiencing this complication at some stage in their lives.[8] Neurological, vascular, and biomechanical factors contribute to diabetic foot ulceration. Approximately 50% to 60% of ulcers become infected, and about 20% of moderate to severe infections lead to lower extremity amputations. The 5-year mortality rate for individuals with a diabetic foot ulcer is approximately 30%, exceeding 70% for those with a major amputation.[9,10] Patients with diabetic foot are typically 50-60 years old and most have had diabetes for at least 10 years. Uncontrolled diabetes, if left untreated, can lead to major deformities of the foot.[11] In more advanced cases, amputation of the foot may be necessary. If recognized in time, diabetic foot can be prevented with blood glucose regulation before deformation develops. In this case report, we wanted to draw attention to the importance of the issue by presenting a case of diabetic foot that was not recognized in the early period and prolonged the process, delayed treatment and ultimately developed necrosis.

This work is licensed under a Creative Commons Attribution 4.0 International License.

CASE

A 53-year-old man, 158 cm, 75 kg (BMI: 30 kg/m^2), who worked as a furniture painter, was admitted to the emergency department when his blood glucose level was measured as 389 mg/dl the previous evening. Normally, his blood glucose level was around 140-150 mg/dl. The patient had type 2 DM for 7 years. His compliance to treatment was poor. He had complaints of burning, weakness and numbness in his feet for 3-4 years. He did not think that these complaints were due to his diabetes because he worked standing all the time. The patient was asked about a foot wound observed in the system query. Wounds started to appear on the soles of the feet 2-3 weeks ago. The patient did not pay much attention to this and neglected it. The wounds healed and recurred from time to time; diabetic ulcers formed on the soles of the 1st, 3rd and 4th toes, and necrosis formed on the tip of the 5th toe of the left foot. The patient was treated at an external center for this, but there was no improvement and his blood sugar remained high, so she came to the emergency department with concern. He also had hypertension, benign prostatic hypertrophy, lumbar disc herniation and coronary artery disease. He underwent coronary angiography followed by coronary by-pass and surgery for lumbar disc herniation. On physical examination, the patient had nystagmus and Tinnel test was positive. Neurologic examination revealed deep sensory loss and visual field defects. Vital signs were normal. Postprandial blood glucose 421 mg/dl, glycated hemoglobin (HbA1c) 9.1%, urea: 76 mg/dl (N: 17-43), serum creatinine: 1.69 mg/dl (0.7-1.2), eGFR: 51 ml/min/1.73 m^2, C-reactive protein 12.1 mg/dl (N: 0-5), albumin: 3.1 g/dl (N: 3.5-5.2), pH: 7.27 (7.35-7.45) and had mild metabolic acidosis. There was no significant pathology in other investigations. There were no findings suggestive of dehydration. There was no growth in urine culture and ketones were negative in complete urinalysis. He was using subcutaneous insulin 3 times a day, acetylsalicylic acid, ACE inhibitor, calcium channel blocker, cilostazol, pentoxifylline. She was hospitalized in the ward because of high blood glucose levels. She was treated and followed up until his blood sugar was regulated in our hospital. Daily dressings and debridement were performed for the wounds on the patient's foot and intravenous antibiotics (ceftriaxone) were administered. The patient's condition stabilized and basal-bolus insulin treatment, moxifloxacin, GLP-1 agonists were recommended in the discharge regimen and oral medications were continued. During the follow-up, the patient's active infection improved, the ulcers on the 1st, 2nd and 4th toes started to heal and the dry gangrene on the distal end of the 5th toe of the left foot was limited. An outpatient clinic visit was recommended for the distal end of the 5th toe of the left foot to be evaluated for amputation by orthopedics. The patient was discharged after the necessary information was given, treatment was organized and the patient was advised to come for follow-up (Figure).

Figure. Images of patient with diabetic foot: Wagner 5 ulcer and demarcation line on the 5th finger

DISCUSSION

Obesity and diabetes are frequently seen together.[1-3,8] Diabetic patients may experience polyuria, dry mouth, polydipsia, weakness-fatigue, polyphagia, delayed healing of wounds, and paresthesia in the hands and feet due to irregular blood sugar levels.[10-12] Diabetes that develops as a result of obesity causes inflammation in the vascular structures of the kidney in the long term, impairing blood

flow to the kidney and glomerular filtration.[13] Prolonged high plasma glucose levels may cause retinopathy in the eye, macular edema by increasing the permeability of the arteries in the eye, and cataract development by increasing end products in the polyol pathway.

DM can also damage peripheral nerves, leading to complaints such as loss of sensation, burning, severe pain and numbness. These symptoms usually start at the fingertips of the hands and feet. These patients are slow to recognize when they are injured or when necrosis begins. Traumatic wounds on the feet are among these. This condition, called diabetic foot, develops due to different etiological reasons. There is consensus that the most important cause is polyneuropathy. In industrialized societies, the main cause of polyneuropathy is diabetes.[8]

With timely diagnosis and treatment, it is possible to prevent both obesity and related diabetes. Early diagnosis is very important to improve the patient's quality of life and minimize the risk of complications. When diagnosed early, lifestyle changes can prevent obesity and diabetes-related complications. Weight loss is clearly beneficial in reducing the risk of developing diabetes. In the Diabetes Prevention Program, an average weight loss of 5.5% over 2.8 years was shown to reduce the risk of prediabetes converting to diabetes by 58%.[11] Medical and surgical treatments can be applied if lifestyle changes are not sufficient or if the diagnosis is late. GLP1 agonists that reduce appetite and regulate blood glucose can be used. GLP1 agonists may be protective for diabetes and obesity. The choice of medication should be made taking into account the patient's clinical condition and compliance with the treatment. Various surgical methods can also be applied if the patient has a condition that prevents the use of medication or if the patient's compliance with the treatment is insufficient. However, surgical methods also bring risks such as venous thromboembolism, sepsis and dysfunction. Therefore, the patient should be recognized and treated before reaching this point.[11-15]

CONCLUSION

Foot problems may occur in diabetic patients due to many reasons. The patient in this case report complained of loss of sensation in his foot and inability to recognize small stones in his shoe. Although the patient had a serious foot problem, he was admitted to the emergency room due to excessive elevation of blood glucose. The severity of the wound on detailed physical examination was recognized early by the clinicians and optimal treatment of the patient was provided both in terms of blood glucose regulation and diabetes-related foot problem without amputation. Lifestyle changes, preventive measures and early diagnosis and treatment of complications that may develop in diabetic patients are important. Thus, it is possible to prevent problems before they grow and to prevent more serious negative situations. This is important for diabetic patients, who are so common, to live as healthy a life as possible.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Karslıoğlu DH. Obezite, tip 2 diyabet ve beslenme. *Klin Tıp Bil.* 2019; 7(3):36-43.
2. WHO Consultation on Obesity (1999: Geneva, Switzerland) & World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. *World Health Organ Tech Rep Ser.* 2000;894:i-253.
3. Swinburn BA, Sacks G, Hall KD, et al. The global obesity pandemic: shaped by global drivers and local environments. *Lancet.* 2011;378(9793):804-814.
4. Bailes BK. Diabetes mellitus and its chronic complications. *AORN J.* 2002;76(2):266-286.
5. Erdogan Erden E, Yazici ZG, Kilic Tatlici C, Aydin S, Kilic FS. Pharmacological approaches in obesity treatment. *Osmangazi J Med.* 2023;45(1):142-150 doi: 10.20515/otd.1093390
6. DeFronzo RA, Ferrannini E, Groop L, et al. Type 2 diabetes mellitus. *Nat Rev Dis Primers.* 2015; 1:15019.
7. Delgado MM. Clinical case: complicated diabetic foot ulcer. *Revista Espanola de Sanidad Penitenciaria*. 2018;20(3):121.
8. Klein S, Gastaldelli A, Yki-Järvinen H, Scherer PE. Why does obesity cause diabetes? *Cell Metabolism*. 2022;34(1):11-20.
9. Armstrong DG, Tan TW, Boulton AJ, Bus SA. Diabetic foot ulcers: a review. *JAMA*. 2023;330(1): 62-75.
10. McDermott K, Fang M, Boulton AJ, Selvin E, Hicks CW. Etiology, epidemiology, and disparities in the burden of diabetic foot ulcers. *Diabetes Care.* 2023;46(1):209-221.
11. Rosskopf AB, Loupatatzis C, Pfirrmann CW, Böni T, Berli MC. The Charcot foot: a pictorial review. *Insights Imaging.* 2019;10(1):77.
12. Good to know: diabetes symptoms and tests. *Clin Diabetes*. 2020;38(1): 108. doi: 10.2337/cd20-pe01
13. Thomas MC, Brownlee M, Susztak K, et al. Diabetic kidney disease. *Nat Rev Dis Primers.* 2015;1(1):15018.
14. Diabetes Prevention Program Research Group, Knowler WC, Fowler SE, et al. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *Lancet*. 2009; 374(9702):1677-1686.